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FIG. 1

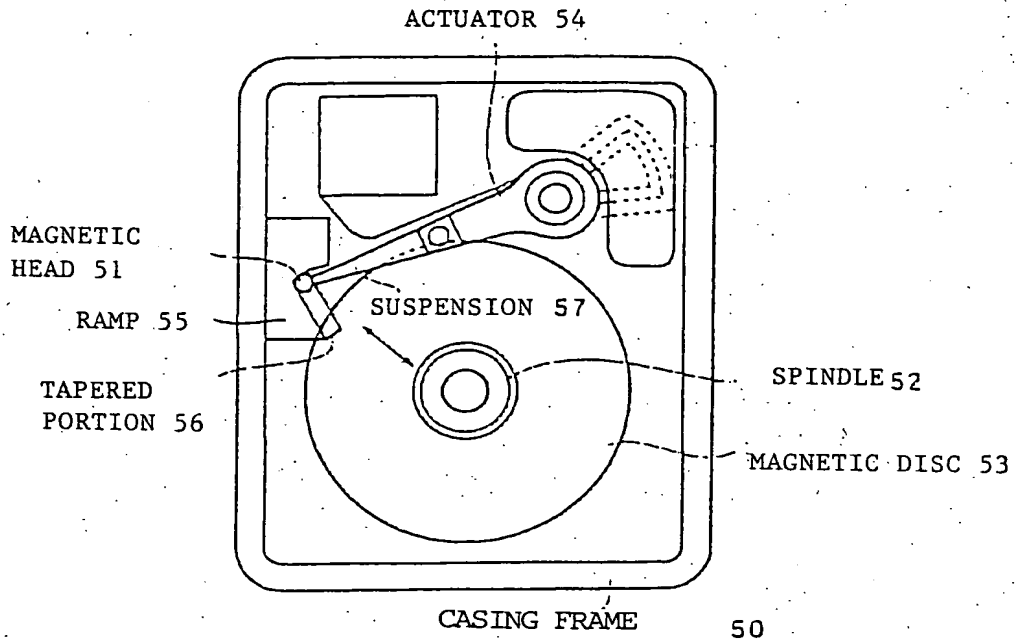


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FIG. 2

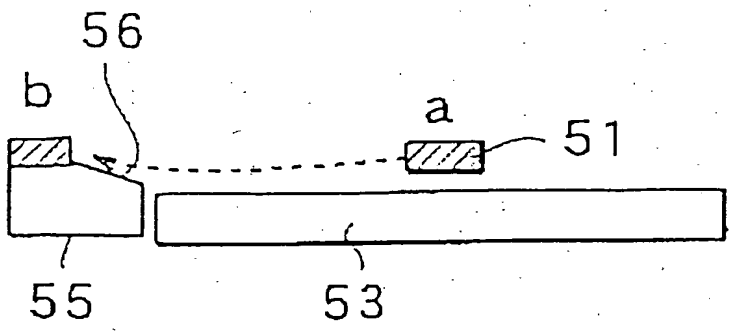


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FIG. 3

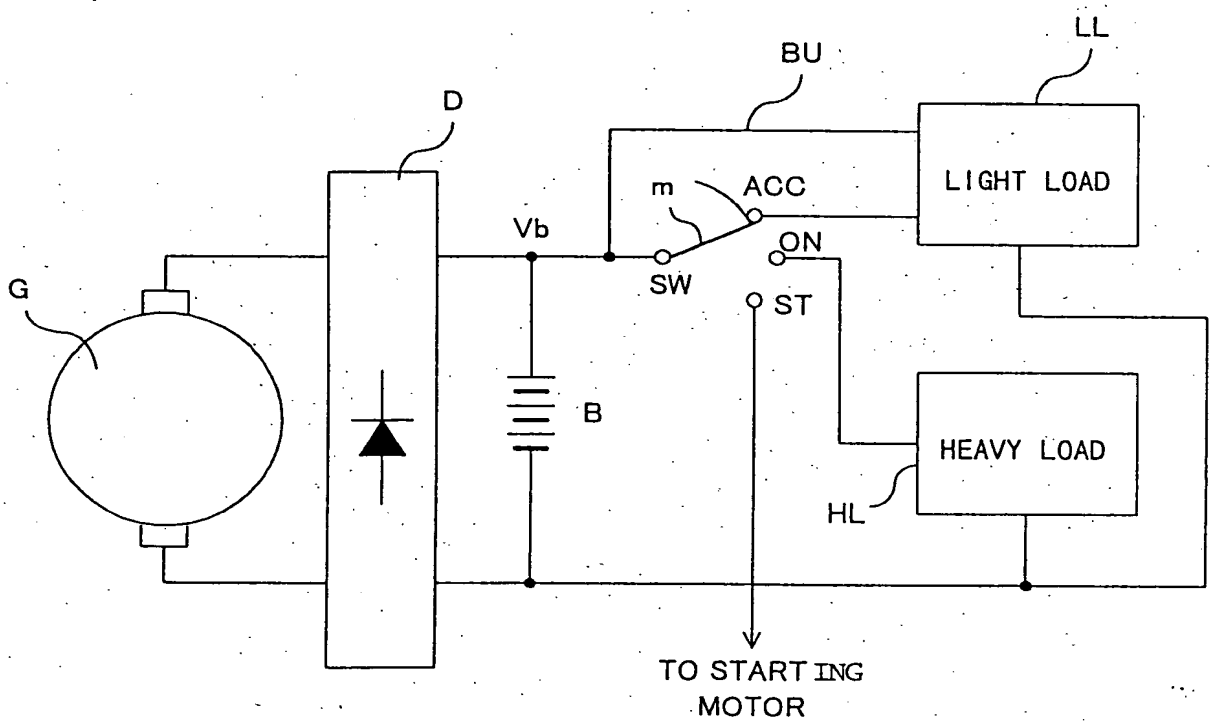


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FIG. 4A

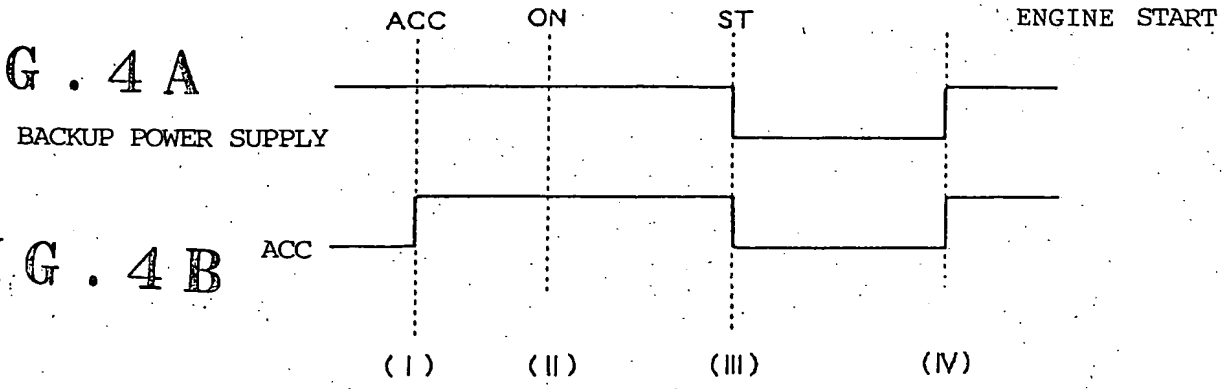


FIG. 4B

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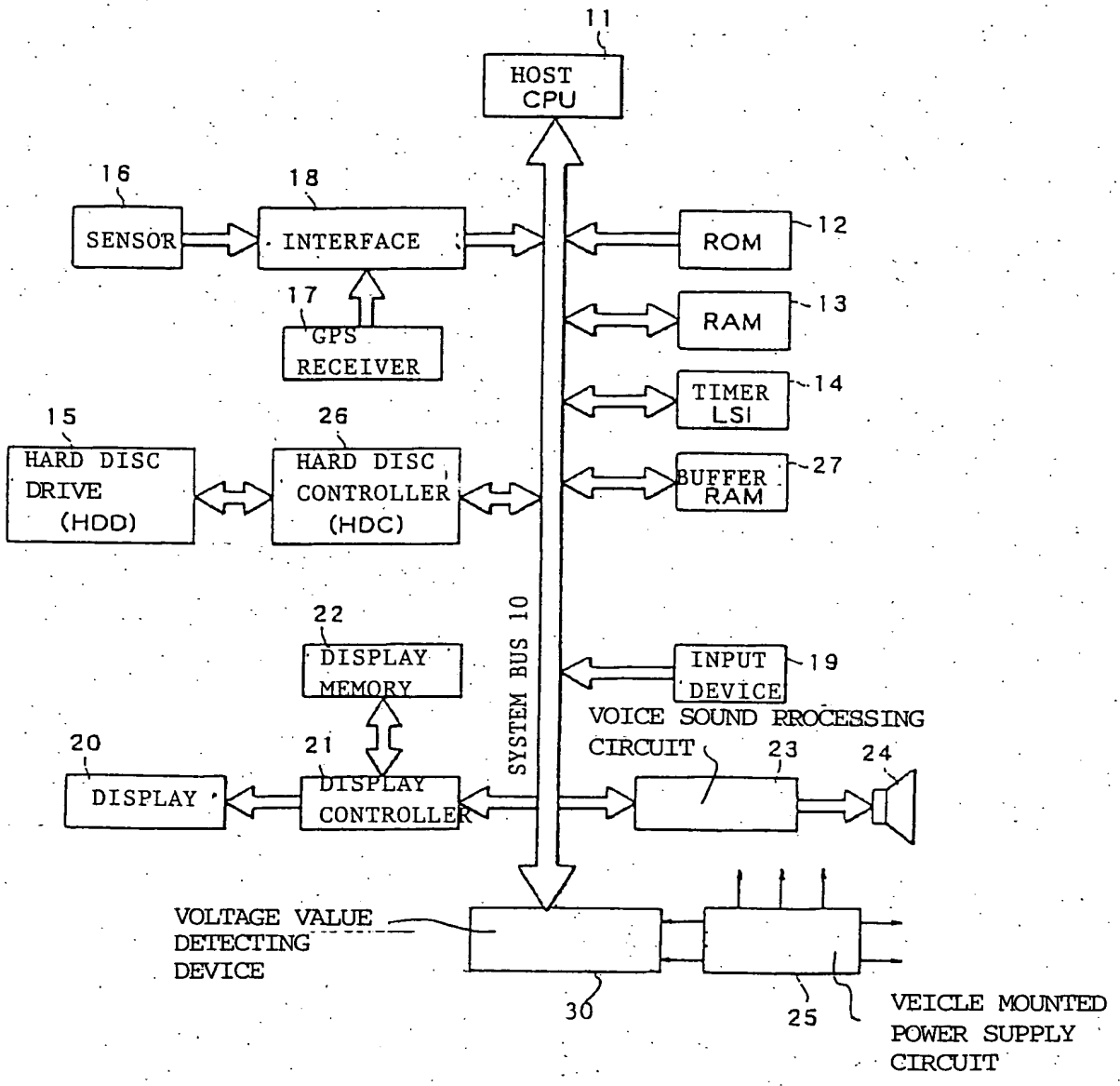
FIG. 5


11
HOST CPU
16
SENSOR
18
INTERFACE
12
ROM
17
GPS RECEIVER
13
RAM
14
TIMER LSI
15
HARD DISC DRIVE (HDD)
26
HARD DISC CONTROLLER (HDC)
27
BUFFER RAM
22
DISPLAY MEMORY
SYSTEM BUS 10
19
INPUT DEVICE
VOICE SOUND PROCESSING CIRCUIT
23
24
20
DISPLAY
21
DISPLAY CONTROLLER
VOLTAGE VALUE DETECTING DEVICE
30
25
VEICLE MOUNTED POWER SUPPLY CIRCUIT

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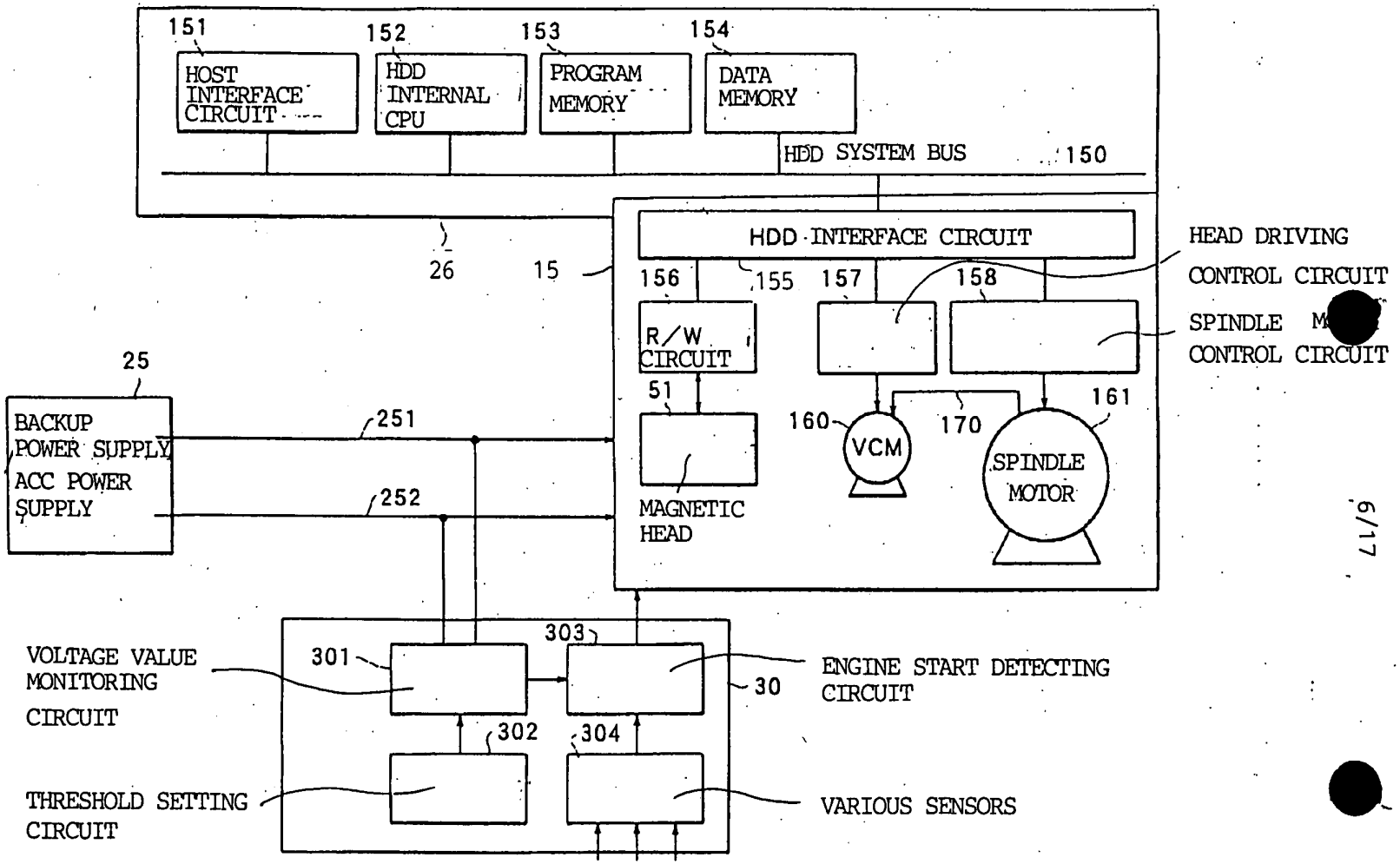


FIG. 6



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FIG. 7A

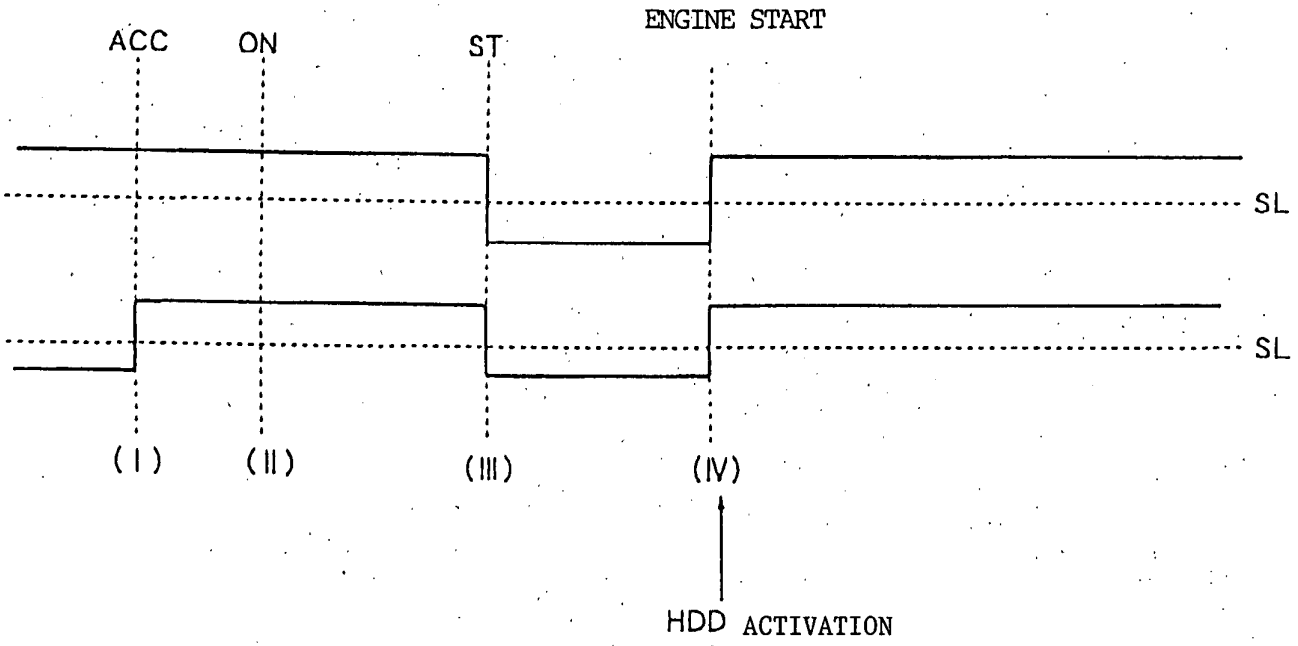


FIG. 7B



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FIG. 8

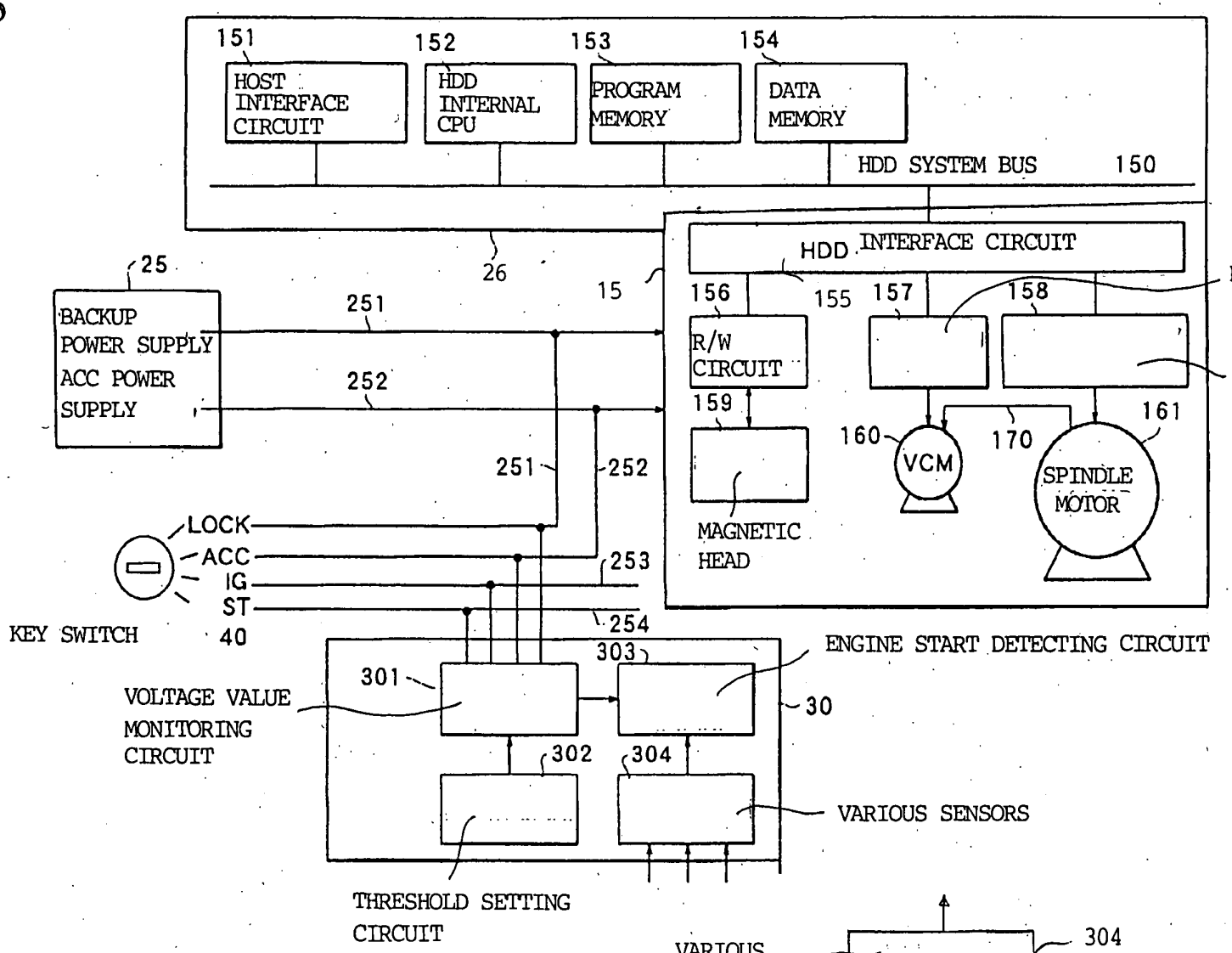


FIG. 10

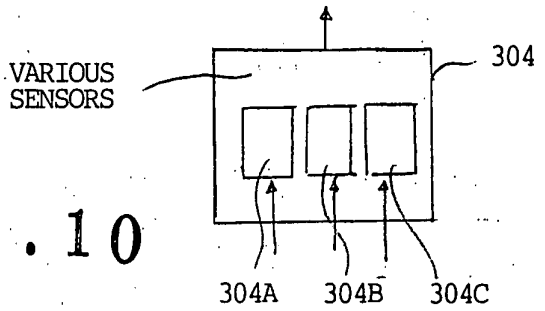




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FIG. 9A

FIG. 9B

FIG. 9C

FIG. 9D

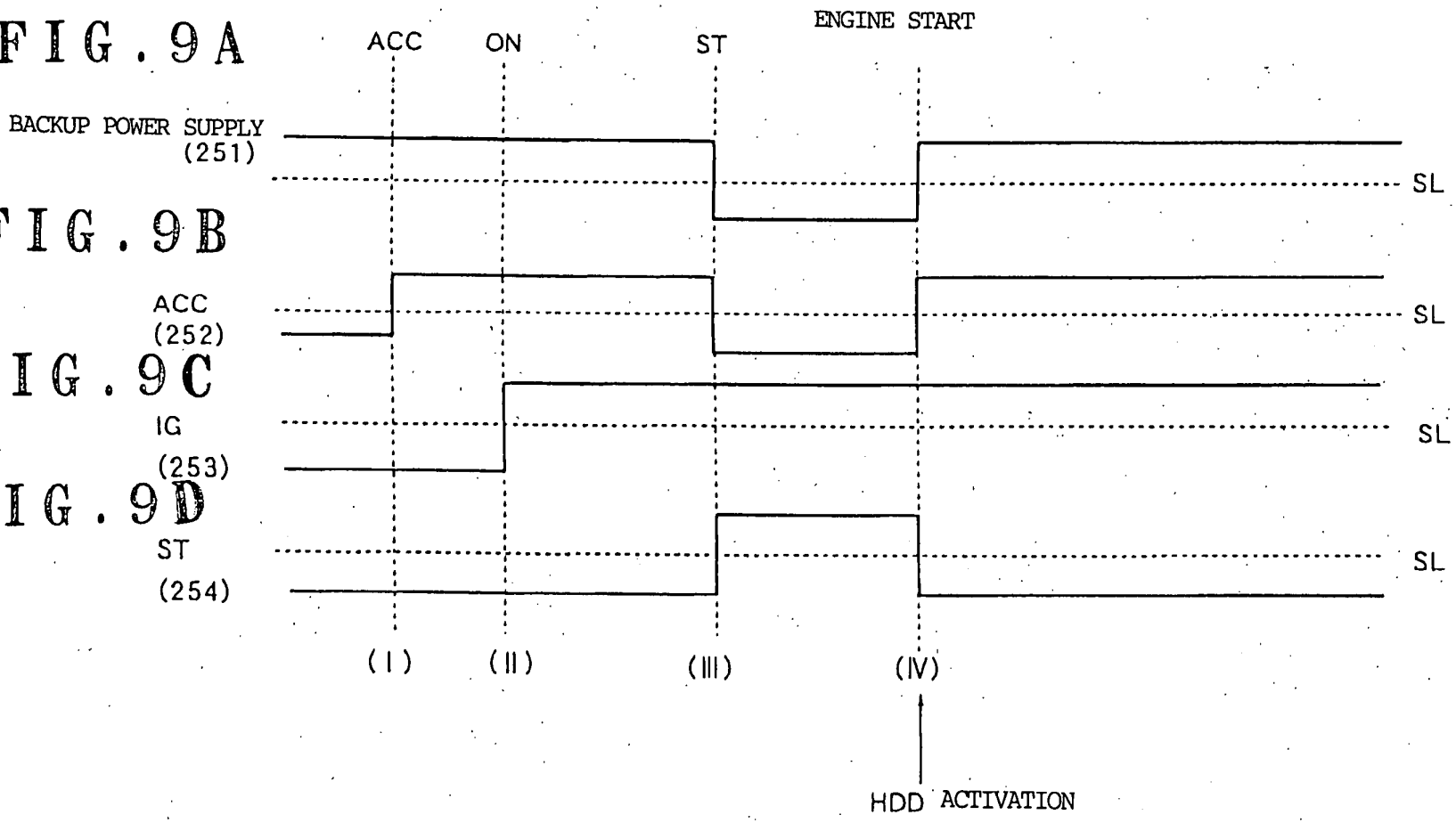

FIG. 11

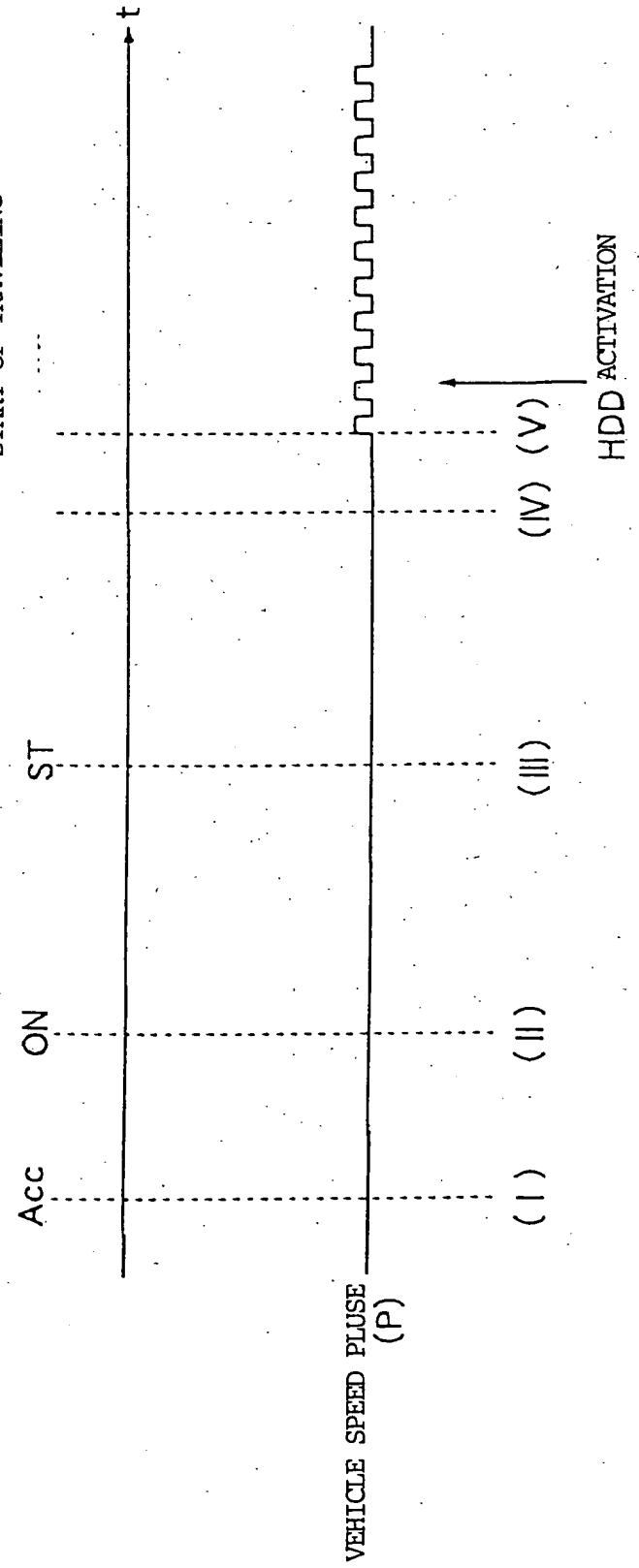
t
Acc
ON
ST
ENGINE START
START OF TRAVELING
(I)
(II)
(III)
(IV)
(V)
HDD ACTIVATION
VEHICLE SPEED PLUSE
(P)

FIG. 12

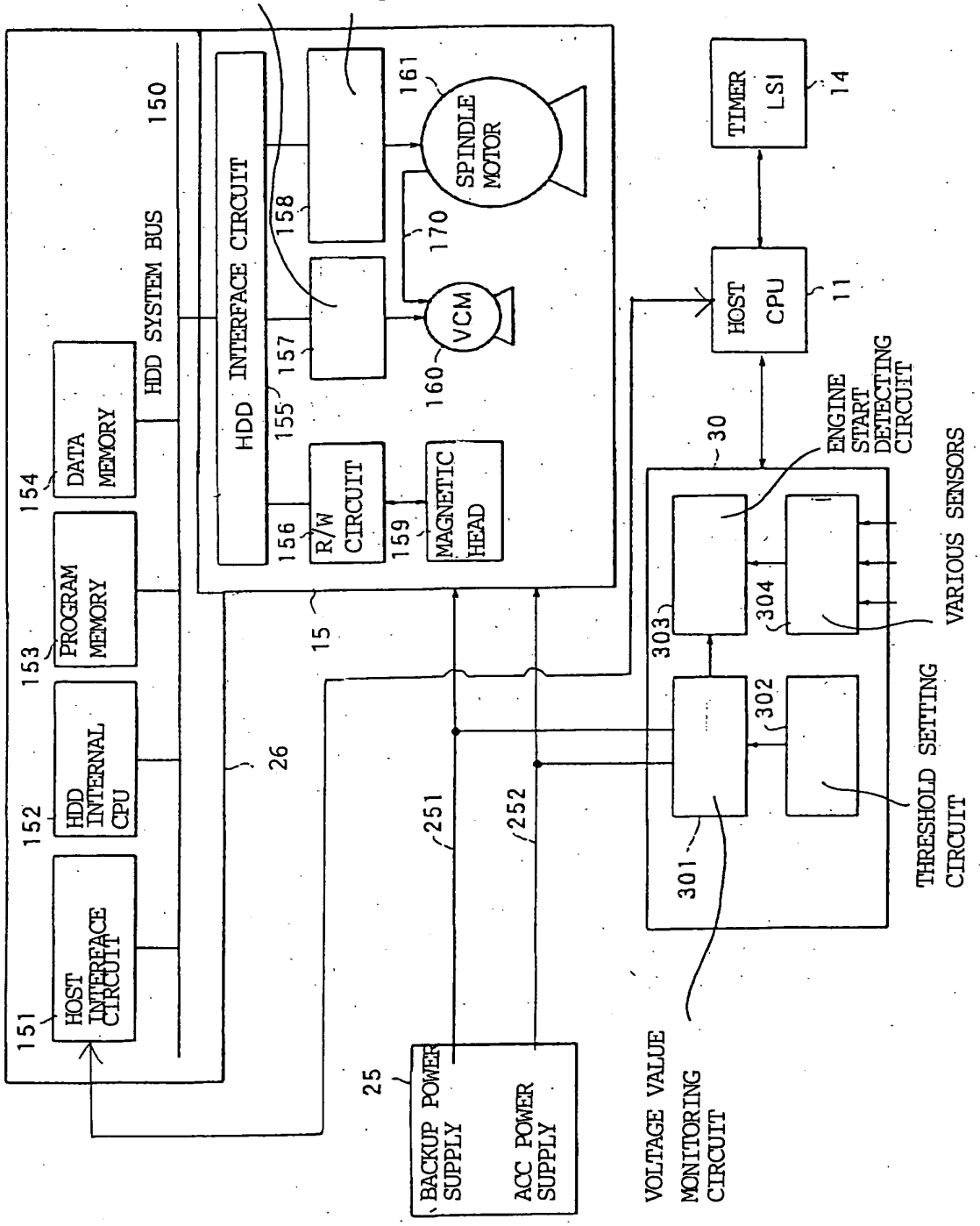
HEAD DRIVING CONTROL CIRCUIT
SPINDLE MOTOR CONTROL CIRCUIT
HDD SYSTEM BUS
150
HDD INTERFACE CIRCUIT
158
161
SPINDLE MOTOR
170
VCM
160
157
155
R/W CIRCUIT
156
159
MAGNETIC HEAD
15
TIMER LSI
14
HOST CPU
11
30
ENGINE START DETECTING CIRCUIT
303
304
VARIOUS SENSORS
302
THRESHOLD SETTING CIRCUIT
301
VOLTAGE VALUE MONITORING CIRCUIT
251
252
26
25
BACKUP POWER SUPPLY
ACC POWER SUPPLY
151
HOST INTERFACE CIRCUIT
152
HDD INTERNAL CPU
153
PROGRAM MEMORY
154
DATA MEMORY

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FIG. 13A

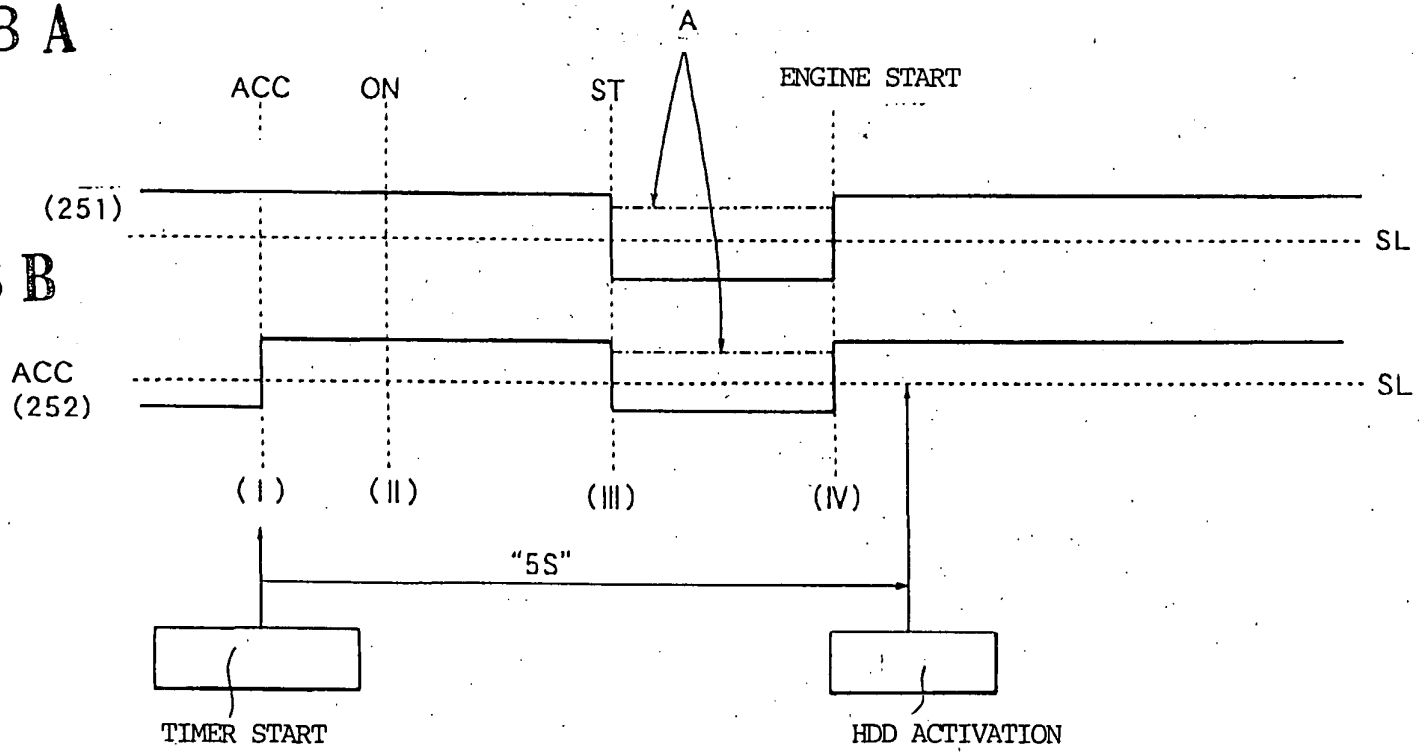


FIG. 13B

FIG. 14A

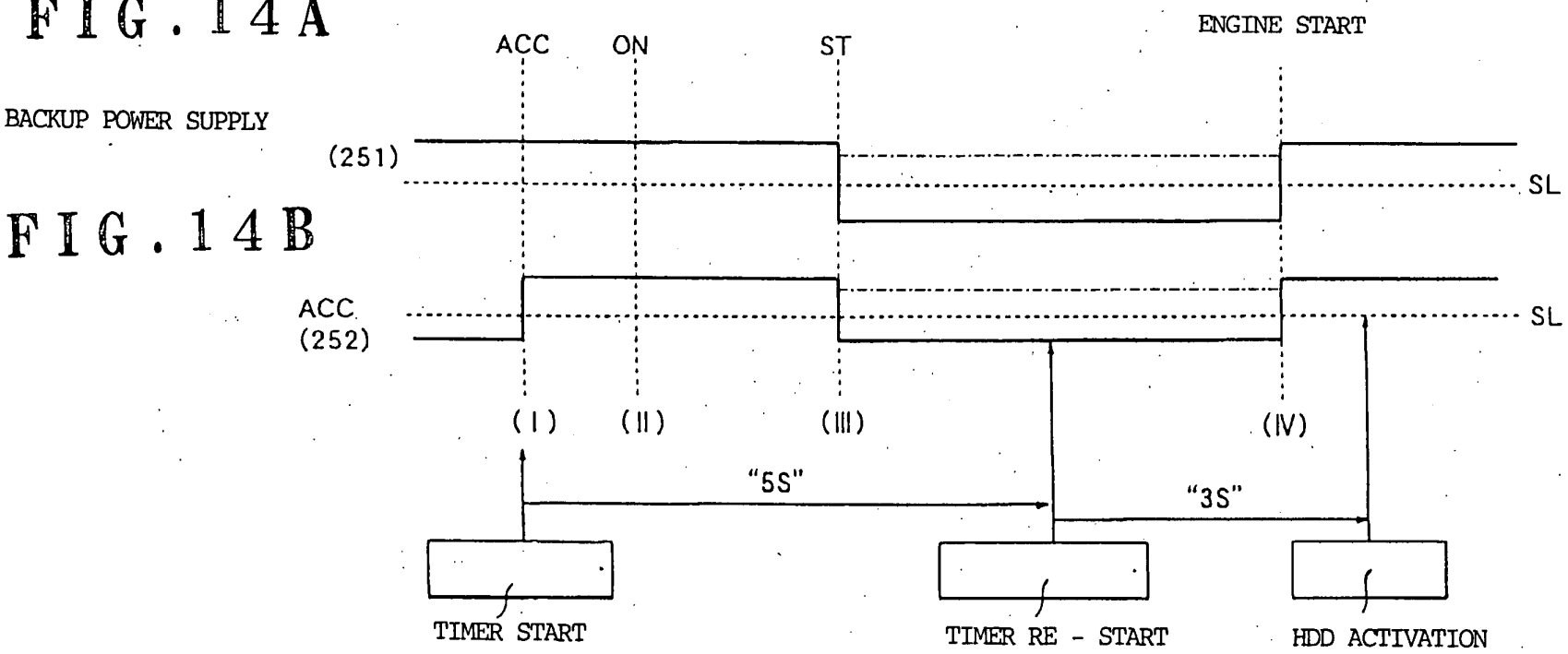


FIG. 14B



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FIG. 15A

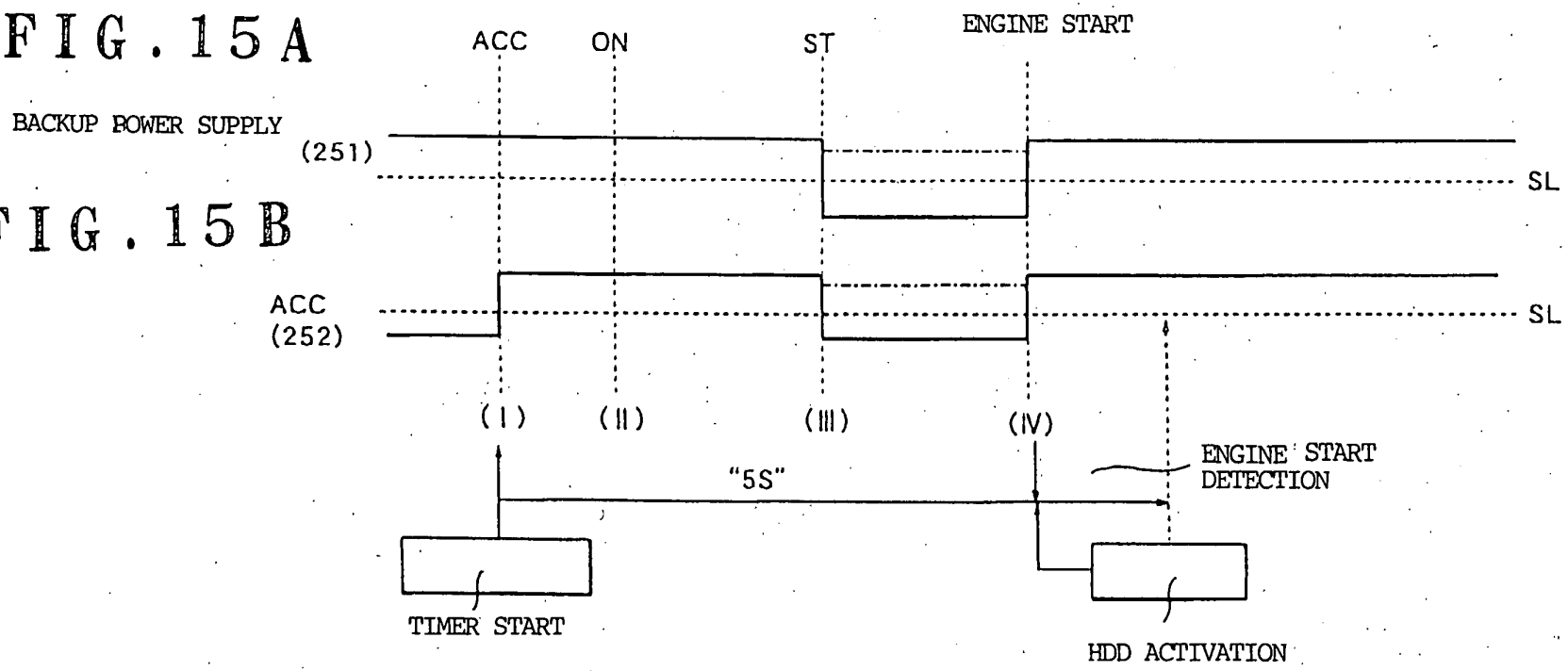


FIG. 15B



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FIG. 16A

BACKUP POWER SUPPLY

FIG. 16B

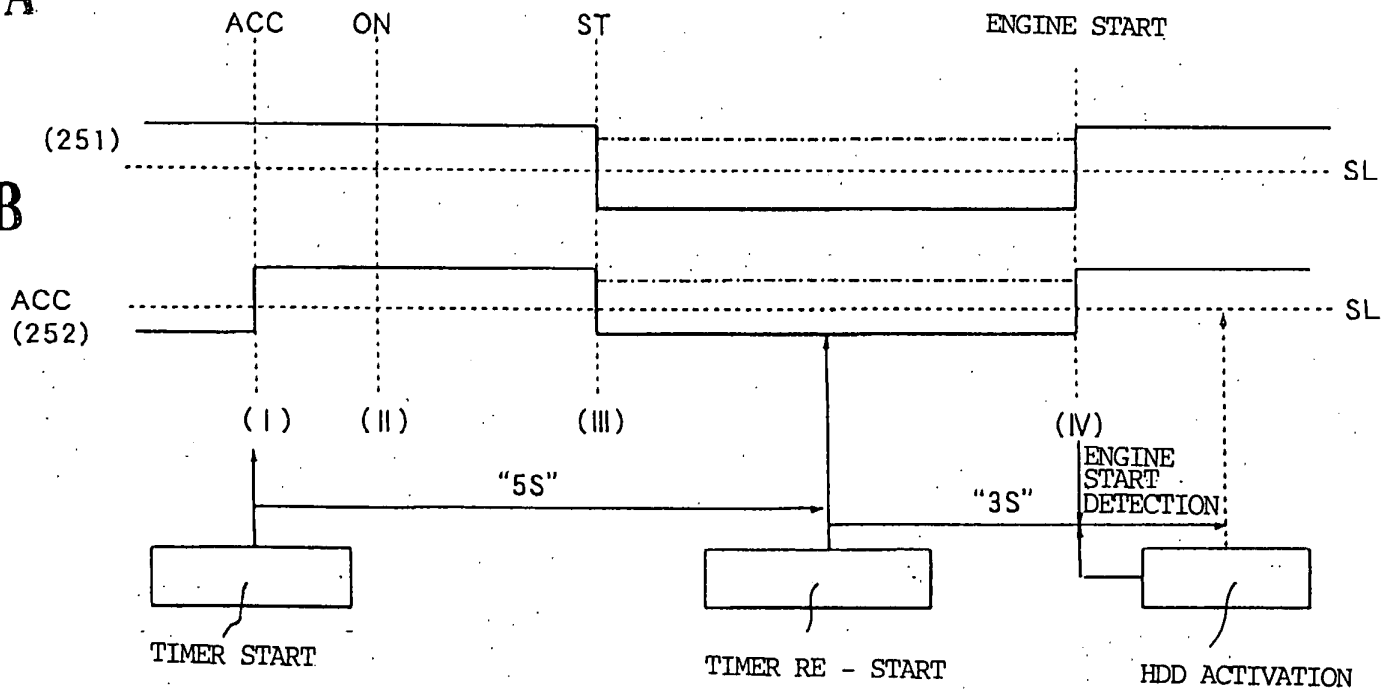




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FIG.17

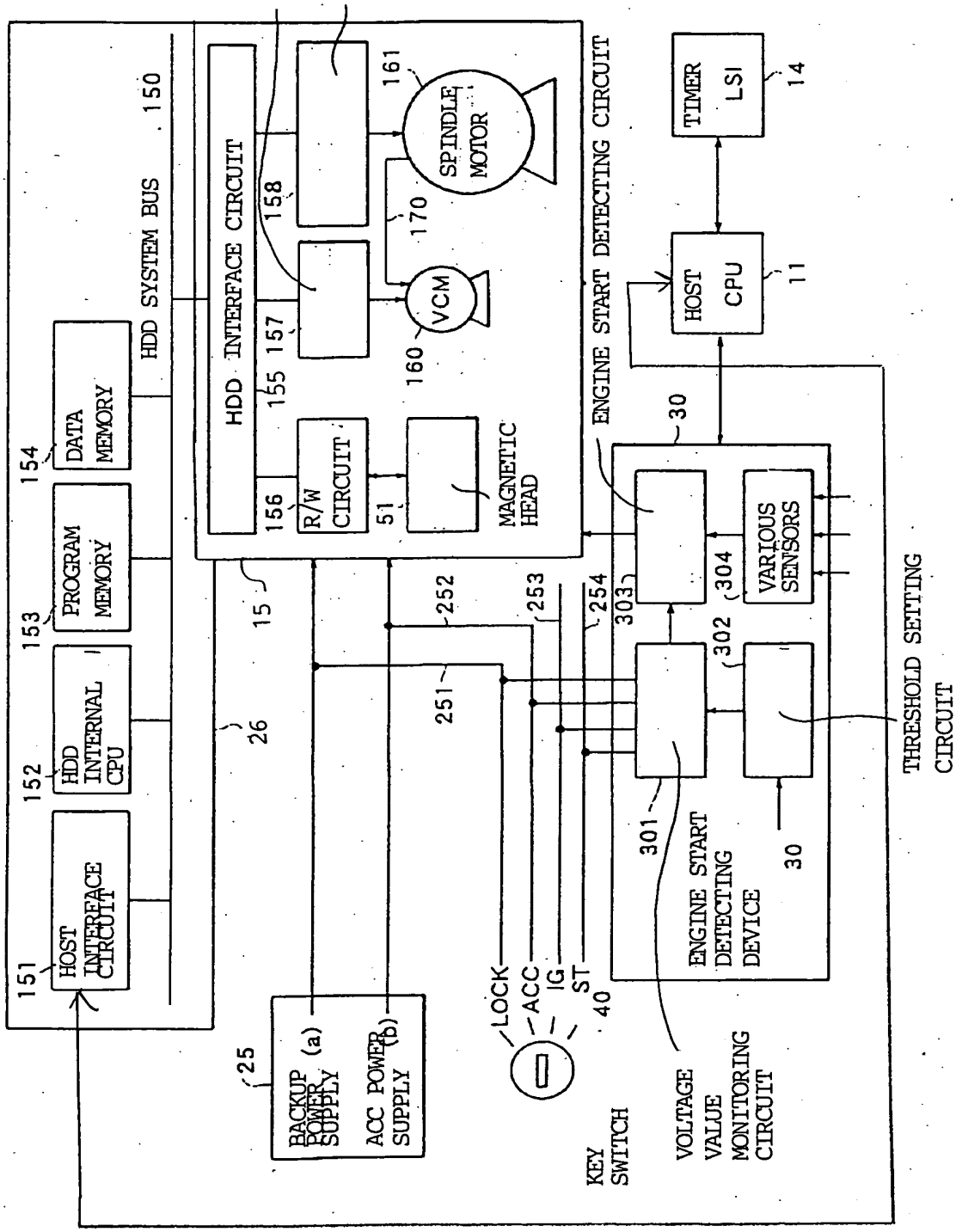
HEAD DRIVING CONTROL CIRCUIT
SPINDLE MOTOR CONTROL CIRCUIT
HDD SYSTEM BUS
150
HDD INTERFACE CIRCUIT
158
161
SPINDLE MOTOR
170
VCM
160
157
155
R/W CIRCUIT
156
51
MAGNETIC HEAD
DATA MEMORY
154
PROGRAM MEMORY
153
HDD INTERNAL CPU
152
HOST INTERFACE CIRCUIT
151
15
26
252
253
254
251
ENGINE START DETECTING CIRCUIT
30
TIMER LSI
14
HOST CPU
11
303
304
VARIOUS SENSORS
302
301
ENGINE START DETECTING DEVICE
30
THRESHOLD SETTING CIRCUIT
25
BACKUP POWER SUPPLY (a)
ACC POWER SUPPLY (b)
LOCK
ACC
IG
ST
40
KEY SWITCH
VOLTAGE VALUE MONITORING CIRCUIT

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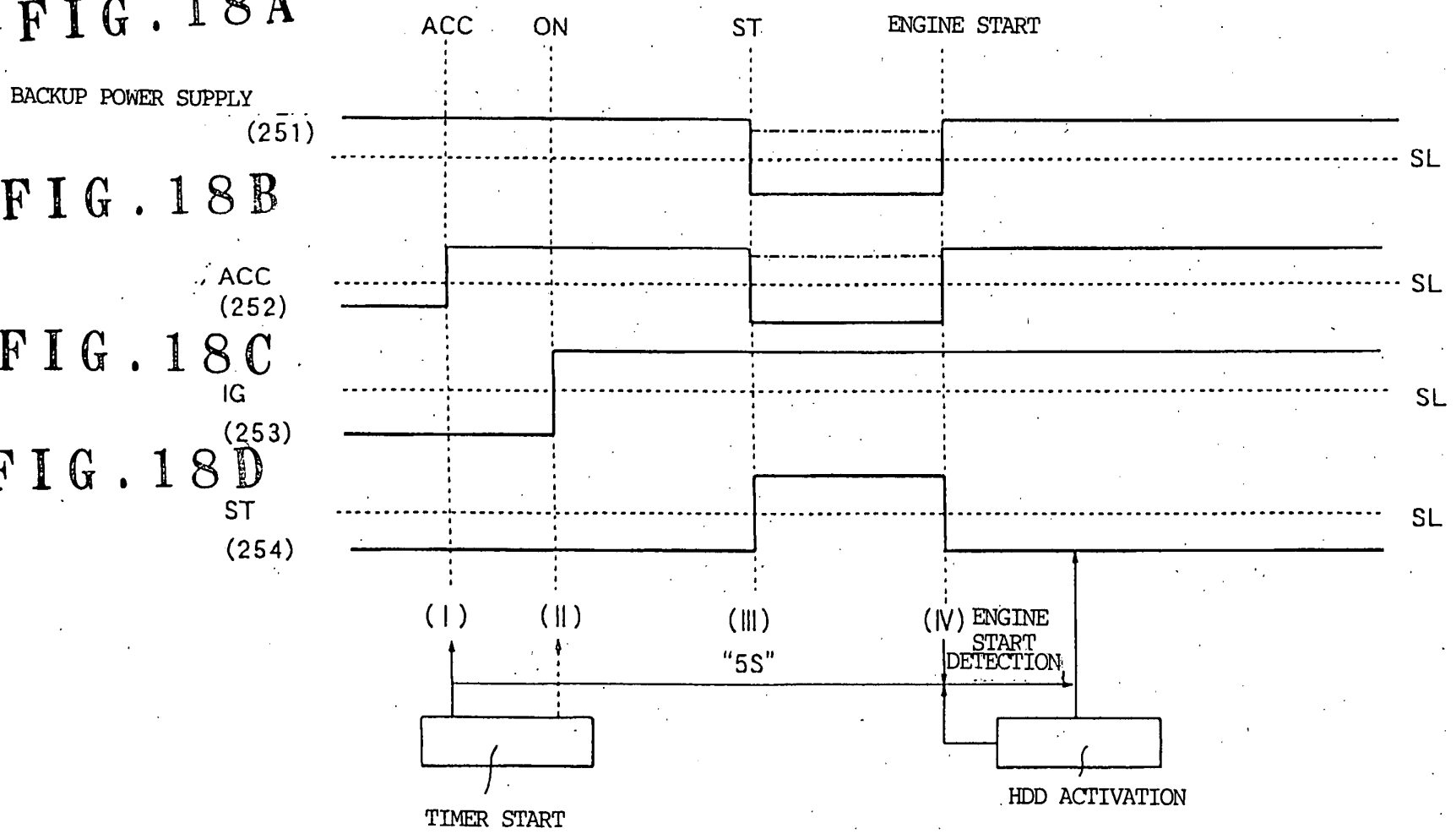
FIG. 18A

FIG. 18B

FIG. 18C

FIG. 18D



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PCN01-0167